

CLAIMS

Claim 1 A method for recording and reproducing with an optical recording medium, in which information is recorded or reproduced by directing a laser beam at an optical recording medium having spiral or concentric circular grooves for tracking a laser beam and provided with one or more information recording layers, the recording and reproduction method comprising the steps of:

directing the laser beam at the grooves formed in an identification region of the optical recording medium;

directing the laser beam at the grooves formed in an information recording region of the optical recording medium;

controlling the focal point of the laser beam to focus on the information recording layer;

receiving the laser beam reflected by the information recording layer with a photodetector that is split into at least two parts by a split line parallel to the direction of the grooves;

determining whether the grooves on the side where the laser beam is incident are convex or concave on the basis of a sum signal and difference signal of the photodetection signals outputted from the split photodetector; and

subjecting the grooves to tracking control on the basis of the result of the determination step.

Claim 2 The method for recording and reproducing with an optical recording medium according to Claim 1, wherein the spot diameter of the laser beam directed at the information recording layer is set larger than the width of the grooves formed in the identification region.

Claim 3 The method for recording and reproducing with an optical recording medium according to Claim 1 or 2, wherein the step of controlling the focal point of the laser beam is performed on at least one information recording layer.

Claim 4 The method for recording and reproducing with an optical recording medium according to Claim 3, further comprising a step of determining whether the grooves of the information recording layer not subjected to the step of controlling the focal point of the laser

beam are convex or concave on the basis of recording track information stored in a control information region of the optical recording medium.

Claim 5 The method for recording and reproducing with an optical recording medium according to any of Claims 1 to 4, wherein the recording or reproduction of information is performed using an optical recording medium in which information signals have not been recorded in the grooves formed in the identification region.

Claim 6 An optical recording medium having spiral or concentric circular grooves for tracking a laser beam and provided with an information recording layer, having at least an identification region and an information recording region, wherein the track pitch Tp_2 of the grooves formed in the identification region is larger than the track pitch Tp_1 of the grooves formed in the information recording region, and the width of the grooves formed in the identification region is less than the width between the grooves.

Claim 7 An optical recording medium having spiral or concentric circular grooves for tracking a laser beam and provided with two or more information recording layers, having an identification region and an information recording region in at least one information recording layer, wherein the track pitch Tp_2 of the grooves formed in the identification region is larger than the track pitch Tp_1 of the grooves formed in the information recording region, and the width of the grooves formed in the identification region is less than the width between the grooves.

Claim 8 The optical recording medium according to Claim 6 or 7, wherein the width of the grooves formed in the identification region is substantially equal to the width of the grooves formed in the information recording region.

Claim 9 The optical recording medium according to any of Claims 6 to 8, further having a control information region, wherein recording track information is stored in the control information region.

Claim 10 A recording and reproduction apparatus that records and reproduces information by directing a laser beam at an optical recording medium having spiral or concentric

circular grooves for tracking a laser beam and provided with one or more information recording layers, the recording and reproduction apparatus comprising:

an irradiation unit for directing the laser beam at the optical recording medium;

a light receiving unit for receiving the laser beam reflected by the information recording

5 layer by means of a photodetector that is split into at least two parts by a split line parallel to the direction of the grooves; and

10 a control unit for determining whether the grooves on the side where the laser beam is incident are convex or concave on the basis of a sum signal and difference signal of the photodetection signals outputted from the split photodetector, and subjecting the grooves to tracking control on the basis of the determination result.

Claim 11 The optical recording medium recording and reproduction apparatus according to Claim 10, wherein the spot diameter of the laser beam directed at the information recording layer is larger than the width of the grooves formed in the identification region.